

ASSEMBLY INSTRUCTIONS (3-68-20A07-0-X)

****Safety Glasses Required***

NOTES: (1) All 2-56 screws are to be torqued 10 inch/ounces).
(2) All 4-40 screws are to be torqued 16 inch/ounces.

1. Cut a length of double coated tape (45) the size of the long side of the syringe chimney on the slide top housing (4). Cut the piece of tape in half length wise. Remove one side of the backing and place the tape on both long sides of the chimney. Remove the backing from the other side of the double coated tape and install the clamp seal (21).
2. Press the cluster gear (8) through the slide housing subassembly (4). Secure the cluster gear with an E-clip (1). Apply pressure to the small gear side of the cluster gear to seat the E-clip.
3. Insert the syringe clamp (40) through the clamp seal (21, already installed) into the syringe chimney. Turn the unit over with the syringe rack facing up.
4. Select one of the two potentiometer subassemblies (30) supplied with the slide kit. Bend the locating tab from it's 90 degree position to 180 degrees. The tab is not used in this application. The locating tab should be on the same plane as the top surface of the potentiometer.
5. Install the clamp gear (34) to the Potentiometer with the ben locating tab.
6. Find the slide torsion spring (31). Install the slide torsion spring onto the clamp gear with the clipped end of the spring toward the gear. Insert the clipped end into the slots in the gear. Examine the other side of the gear. The clipped end of the spring should not extend beyond the end of the gear. If the clipped end of the spring extends beyond the end of the gear the spring must be nipped closer (safety glasses should be worn) until the end of the spring does not extend beyond the gear.
7. Pick up the above-mentioned potentiometer, gear and spring and orient the potentiometer toward the end of the slide subassembly (4) with the motor mount. Using your fingers, rotate the gear toward yourself until it stops. Place the above-mentioned potentiometer, gear and spring into both of the half round mounting recessed on the slide subassembly (4). Slide two pan head screws (33) into the potentiometer clamp (35). The heads of the screws should be on the opposite side of the half moon shaped cutout on the clamp. Place the potentiometer clamp (with screws) into position on the potentiometers neck. Install the screws.
8. Adjust the slide torsion spring so that the looped end (away from the motor) is as parallel to the surface of the slide assembly as possible. Place pan head screws (33) in the spring end clamp. The heads of the screws should be on the opposite side to the half moon shaped cutout on the clamp. Using the torsion spring driver (0-47-20004-3-X), engage the closed loop end of the slide torsion spring. The spring will

be tensioned counterclockwise with the motor on top (or toward yourself if the motor section of the slide is to your left). The spring will be tensioned three half turns (or 1 full turn and 1 half turn, or until the spring loop has been placed parallel with the slide surface the third time). After the spring has been tensioned, the tool must be held in place until the spring end clamp can be put in place. The square portion of the spring end clamp must be placed in the closed loop of the spring. The tension must be maintained while the screws are secured.

9. Install the two set screws (13) in the motor mount inserts on the slide assembly. The set screws should be finger tightened only. Slide the motor mount (12) onto the set screws. Thread two 1/4 inch hex female standoffs (48) onto the inserts. Align the motor mount with the fixture (0-47-20001-0-X). Torque the female hex standoffs to 20 inch-pounds.

NOTE: *If using the black rubber worm/coupling (37) p/n 0-68-20A05-8-X, do not add grease, silicone 111 compound (43).*

Dip the brass motor shaft driver on the stepping motor subassembly into grease silicone 111 compound (43). In order to dampen noise as intended, all four sides of the shaft driver must be coated with the grease. Attach the worm/coupling to the stepping motor S/A (26). Wipe excessive silicon grease from the worm/coupling assembly after the motor is engaged.

- 10.1 *If not using the worm/coupling (37) P/N 0-68-20A05-8-X, do not add grease, silicone 111 compound (43).*

11. Apply STP grease (50) to the tip of the worm gear. Install the stepping motor with the worm coupling into the slide assembly. Insure the tip of the worm is in the worm gear bearing. Place the motor mount back (49) on the motor and set screws. Thread the two hex nuts (27) to secure the motor mount back. Use the 3/26 open end wrench to tighten the two hex nuts.

12. Use the cable seal cutters to cut a slot for the transducer cable in the cable seal (22).

13. Feed the transducer cable through the cable seal. Position transducer cable and cable seal in the slide housing. Insure that the transducer cable is coming out of the slide housing on the track side away from the cluster gear. Place the track in the slide assembly. Slide the track to the bottom position. Use the slot on the syringe clamp with the plunger syringe holder on the track to secure the track to the bottom position.

Pull the cable through the cable seal so that the second edge of the cut out on the flex cable is flush with the cable seal. Secure the cable by placing the cable plug (23) into the cable seal.

14. Wearing safety glasses, assemble the clutch spring (16) onto the lower clutch (17) then onto the upper clutch (18). Caution should be observed during this phase of the

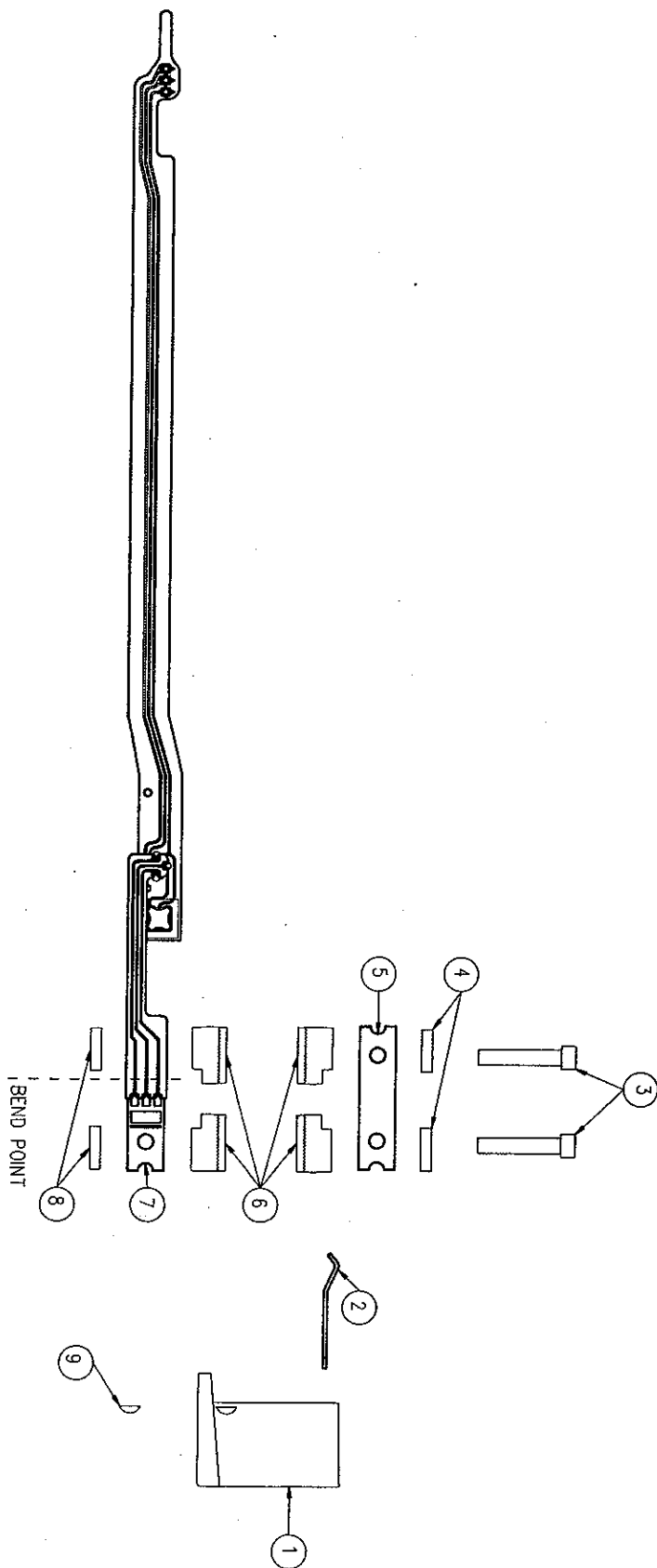
operation, the spring could be forcefully propelled from the clutch halves at any time. Orient the clutch assembly so that the tabs on the two clutches are facing away from the plunger syringe holder (on the track). Insert the clutch assembly into the side of the slide housing and into the square of the track assembly. Slide the clutch assembly toward the side of the square with the tabs. (There is a slot in the track for the tabs). Insure that the pressure transducer cable is clear of the clutch assembly. Insert the clutch key in the space left in square hole. Apply pressure to insure that the clutch key is fully seated.

15. Apply grease (DC111 Item 43) to actuator rod area that engages channel in track and to area that engages slot of clutch lever. Insert the clutch actuator (7) into the clutch assembly from the top of the track. Apply grease (DC111 Item 43) to clutch lever collar/ears that engage with track. Attach the clutch lever (3) and slide the clutch actuator up into the clutch lever. Attach the clutch cover with the two screws (51).
16. Attach the position potentiometer holder (28) to a potentiometer subassembly (30) with the hardware supplied. Be sure the locating lug on the potentiometer is in the slot provided on the holder. Push the position gear (29) onto the pot. Rotate the gear to the full counter clockwise position. Make sure the track is locked by the syringe clamp in the empty position. Install the potentiometer subassembly into the mounts provided and engage the potentiometer gear with the cluster gear. Reset the teeth on the potentiometer position gear 5 teeth counter clockwise. Reengage the potentiometer assembly with the cluster gear. Install the two pan head screws (36). Adjust the gap between the two gears to a minimum. Tighten the screws lightly. Move the track from end to end to check for excessive tightness and backlash. Readjust the potentiometer if necessary.
17. Apply STP grease (50) to the round end of the leadscrew (10). Place the thrust bearing (11) over the greased end of the lead screw. Open the clutch (use the clutch lever) and with the greased end of the lead screw going into the end of the slide housing with the large hole pass the lead screw through the clutch. Release the clutch and align the thrust bearing hole in the top of the slide. Press the thrust bearing until seated into the top of the slide. Press the thrust bearing until seated into the top of the slide assembly. Find two E-clips (14) and making sure the flat side (or dull side) is up (or shiny side down), attach the two E-clips with pliers to the top of the leadscrew.
18. Turn the slide housing up with the square end of the leadscrew facing toward the ceiling. Slide on the water seal with the cupped end facing the leadscrew. Slide on the leadscrew bearing (9). With the bearing insertion tool (0-47-20002-0-X), press firmly into the slide bottom. Turn the slide around and press firmly the end of the leadscrew where the two E-clips are. Make sure there is play (end clearance) and that the leadscrew can rotate freely. If the leadscrew moves freely, slide worm gear (920) onto the end of the leadscrew. Secure the worm gear with an E-clip. Make sure the flat (or dull side) of the E-clip is facing out (or shiny side down). Check the manual operation track from end to end. The track should move freely and not bind.

excessively in the slide. The clutch should clear the leadscrew. There should not be excessive "grinding" of the clutch against the leadscrew.

19. Snap the slide door (38) into the slide housing and secure with two Phillips screws (39).
20. Solder the flex cable to the AUX PCB at connector J2. Assemble the Aux PCB to the slide housing using the two Phillips pan head screws (5).

REV	DCN	DESCRIPTION OF REVISION	APPROVED	DATE
A	94011904	ADD BEND POINT	<i>[Signature]</i>	1-20-94
			<i>O. Tachibana</i>	1-20-94

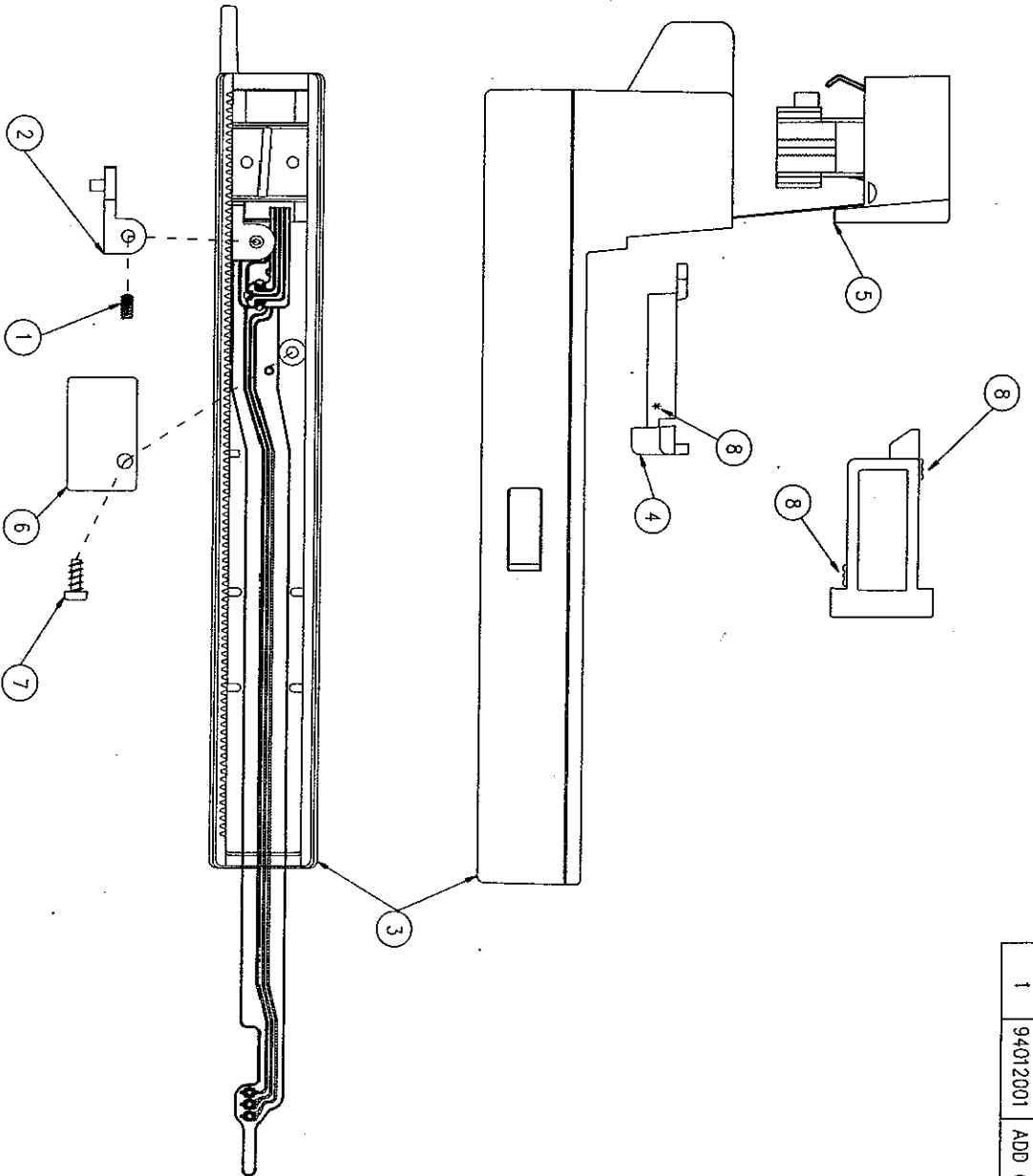


medexinc.
 Transducer S/A
 Part No. 1-68-20A08-0-0

TRANSDUCER S/A ASSEMBLY PROCEDURE (3-68-20A08-0-1)

1. Using the U-Spring insertion tool, install the U-spring (2) into the plunger holder - II (1).
2. Insert socket screws (3) through the transducer screw plate (4), blank sensor plate (5), and the four transducer spacers (6) as shown in the assembly drawing.
3. Install flex circuit S/A (7) onto the end of the socket screws (rotated 90 degrees from the view in the assembly drawing). Flex circuit to be away from the transducer spacers. Install the transducer nut plates and start the socket screw into them.
4. Place the assembled parts into a tool makers vise length wise and tighten the vise (hand tight). Hand tighten the socket screw into the assembly. This process is to square the assembly.
5. Remove the assembly and loosen the socket screw that is on the same side as the flex circuit. The screw should be loosened approximately 1/2 to a full turn.
6. Bend the flex circuit back towards the unloosened socket screw.
7. Insert the assembly into the plunger holder - II (1). Gripping surfaces of the transducer spacers will be placed on the rails on the inside of the plunger holder.
8. Using the tool makers vise, press the assembly into the plunger holder until seated (use hand tight pressure on the vise only). Insure that all the parts in the assembly are in the proper position. The transducer nut and screw plates will tend to move prior to torquing. Torque the loose socket screw to 20 inch-pounds.
9. Press the bent part of the flex circuit into the plunger holder until the flex cable is clear of the holder provided for the strain relief. Install the cable strain relief (9) in the assembly.

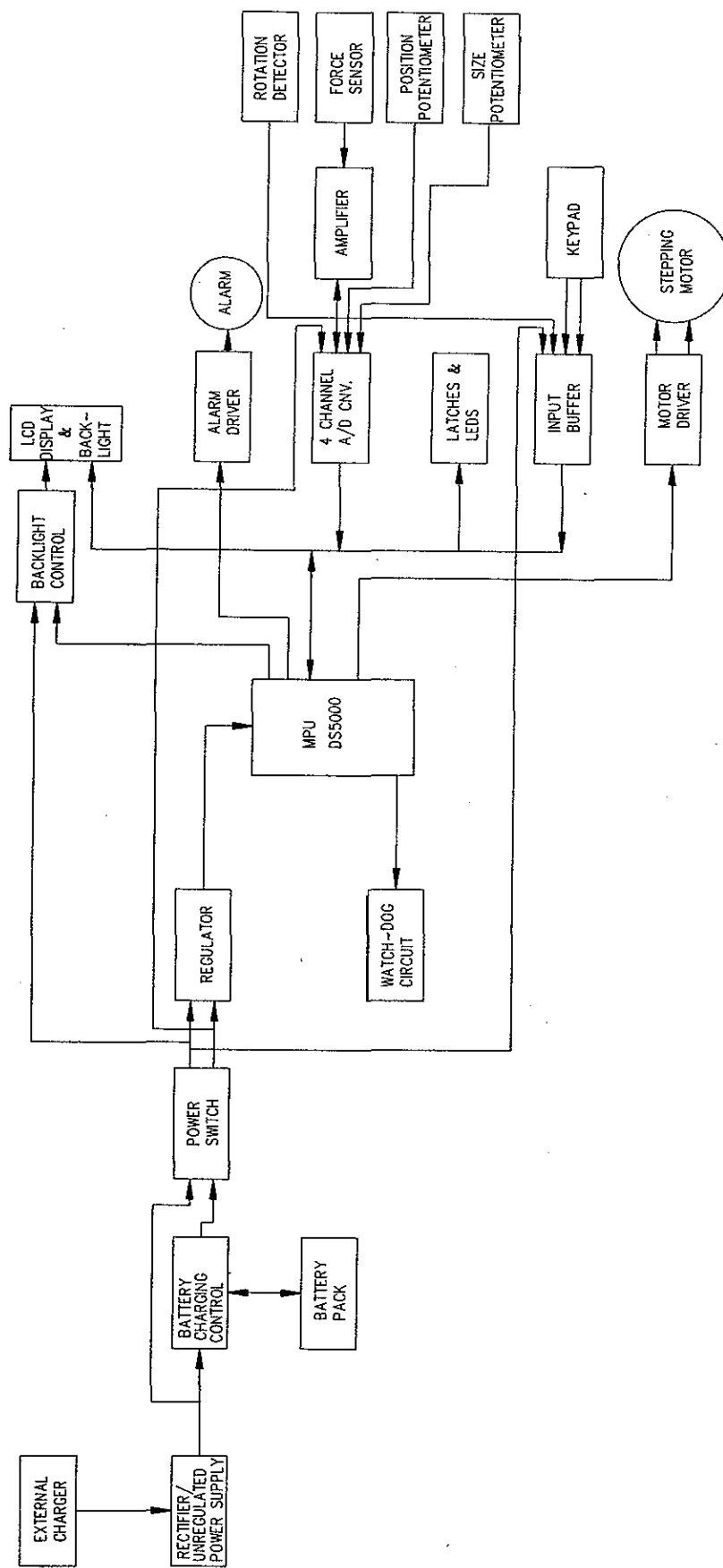
REV	DEN #	DESCRIPTION OF REVISION	APPROVED	DATE
1	94012001	ADD GREASE	<i>D. H. H.</i>	1-20-94
			<i>O. P. Parker</i>	1-20-94

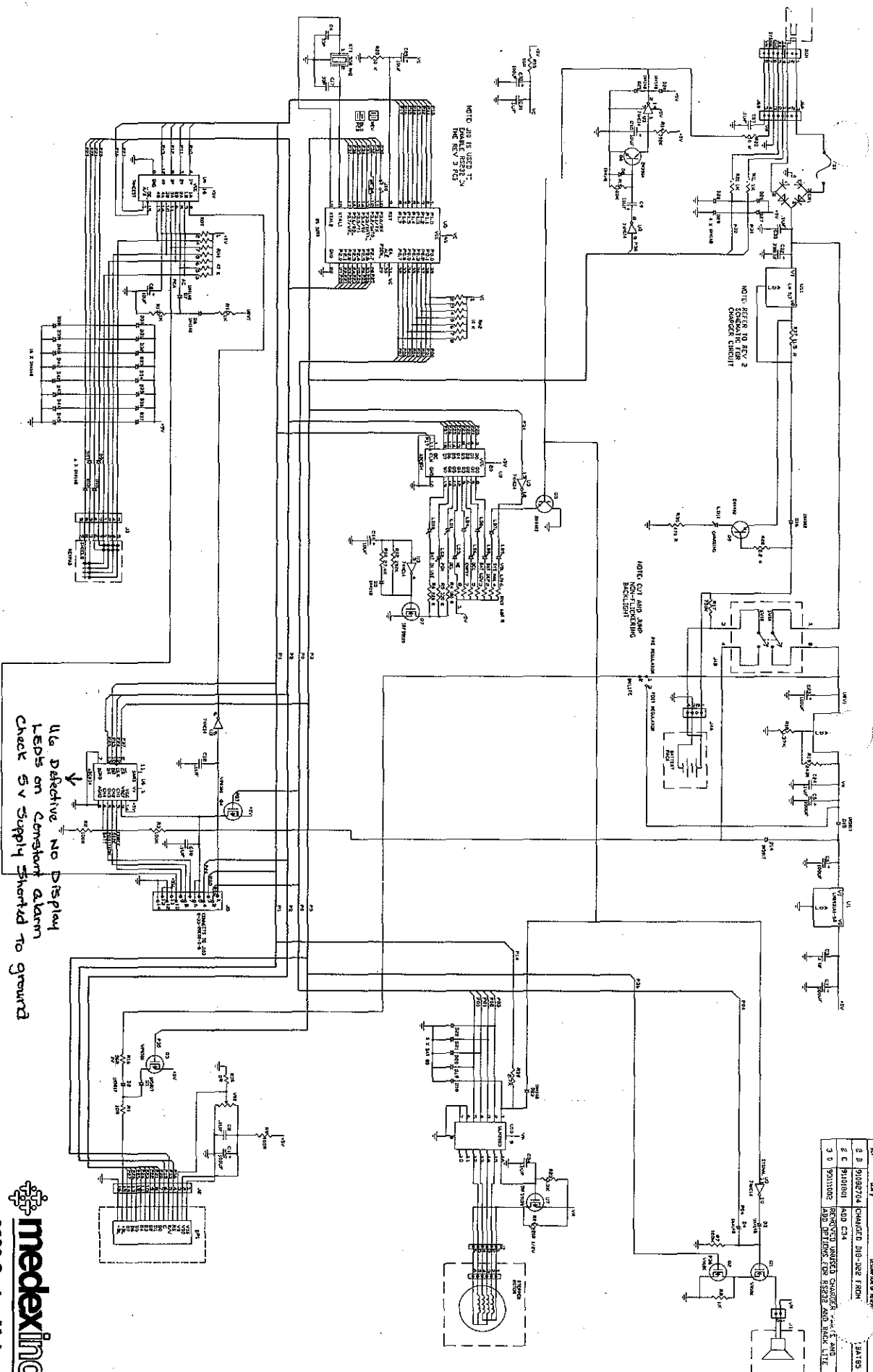


PLUNGER HOLDER/TRACK S/A PROCEDURE (3-68-20A10-0-1)

1. Using a pair of needle nose pliers install the switch cam (2) into the track (3).
2. Apply a thin film of grease (8) to both outside edges of retainer (4). Install the plunger retainer-II (4) into the Track assembly. Insure that the switch cam is engaged with both the track and the plunger retainer.
3. Loosen the socket screw on the transducer S/A approximately one turn. Care must be taken to insure that the parts on the transducer S/A stay in the proper position.
4. Carefully route the flex cable of the transducer S/A through the track and plunger retainer. At the same time, guide the gripping surfaces of the transducers spacers onto the two rails inside the front of the Track-II. Press the transducer S/A into the track until it is flush with the front surface of the track. Insure that the plunger retainer - II moves freely.
5. Place the assembly in the tool makers vise to support torque of the socket screw. Insert the front shim for plunger holder (P/N 0-47-20006-0-0) in between the bottom of the transducer S/A and the bottom edge of the track top. Then insert the side shim for plunger II (P/N 0-47-20009-0-0) in gap (on the sides) between the plunger and the track. Torque the socket screw to 20 inch-pounds. Insure that the retainer II moves freely. If the retainer II does not move freely, loosen the socket screw and re-torque to 20 inch-pounds. Remove shims and remove track from vise.
6. Position the flex circuit under the cam switch and in the track until the holes in the flex circuit mate with the dimples provided in the track. Press small flex toward the transducer blocks until a small bend forms in the flex. Then place the flex-cable clamp (6) in position and use the 7mm pan head screw phillips (7) to secure the assembly.
7. Install the 4-40 3/16 inch set screw (1) in the switch cam (2).
8. If the plunger track 2 subassembly needs the plunger detector calibrated, connect the flex cable on the plunger holder/track to the pump.
9. Adjust pump trimpot (VR2) for a Hexadecimal number OD to 15.
10. Using the force calibrator, adjust force to 16 pounds. Ensure the hexadecimal number read out is greater than 80. Remove the force calibrator.
11. Depress the clutch lever of the plunger holder to open it. Insert the .020 inch plunger holder thickness gage until it is flush with the front face of the transducer S/A. Using the .050 inch hex wrench. Turn the set screw in the cam switch until the hexadecimal number skip to > COH. Adjust the set screw until the hexadecimal number jump is just at the .020 inch gap. Remove the .020 inch gauge from the plunger holder/track gauge.

12. Depress the top end of the plunger holder to open it. Insert the .015 inch plunger holder thickness gauge until it is flush with the front face of the Transducer S/A. The hexadecimal reading should be $> CO$.
13. Depress the clutch lever of the plunger holder to open it. Insert the .025 inch plunger holder thickness gauge until it is flush with the front face of the transducer S/A. The hexadecimal reading should be $< 15H$. If the hexadecimal number is high, the switch cam should be readjusted.
14. Depress the top end of the plunger retainer cage to open it. Insert the penny. Press the face of the plunger assembly together and observe the hex numbers. Mentally note the hex number in the unloaded condition. Repeat the test 4 or 5 times. The hex number with no force (resting) should not vary more than ± 2 hex numbers.
15. Repeat the process until the work order is completed. Then complete the plunger holder/track S/A production test report.





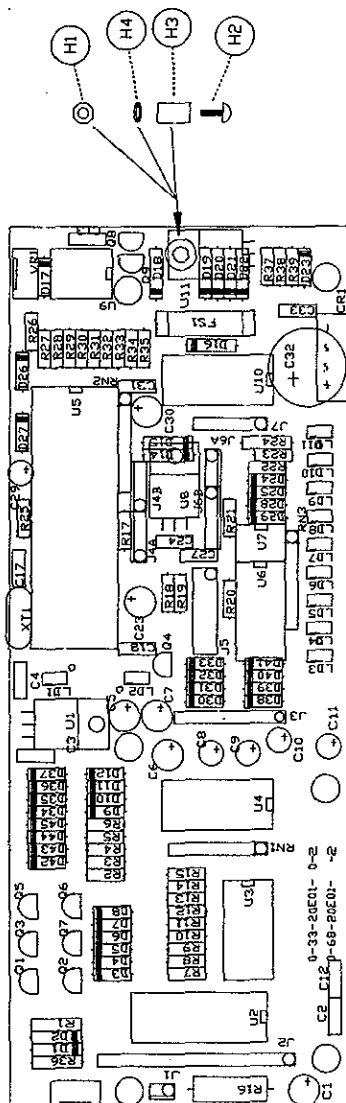
U6 defective $\pm$ no display
LEDs on constant alarm
check 5V supply shorted to ground

NO	QTY	DESCRIPTION OF SERVICE	AMOUNT	DATE
2 B	99082704	CHANGED DIO-22 FROM	3.11	8/21/79
			8.00	8/21/79
2 C	99101801	AND C34	3.11	8/21/79
			8.00	8/21/79
3 0	99111002	REMOVED UNTEST CHASSIS	3.11	8/21/79
		AND OPTONS FOR RS22 AND BACK LITE	8.00	8/21/79

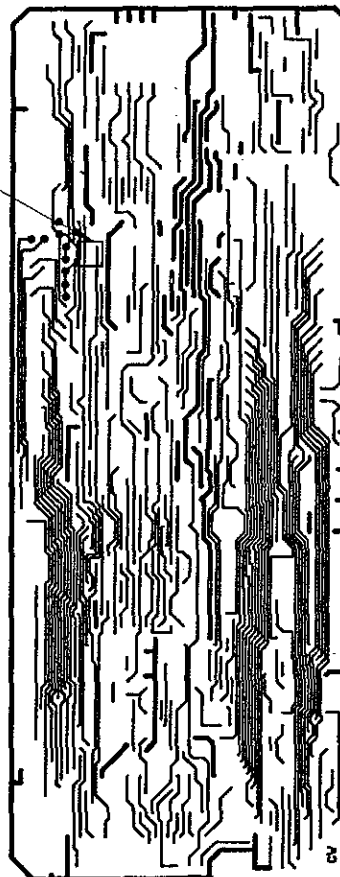
REV	DCN	DESCRIPTION OF REVISION	APPROVED	DATE
B	93031801	ADD IPC ASSEMBLY NOTES	C. LEE	3/19/93
C	93061502	FSI NO CLEAN	R. BIDDY	10/29/93
A0	93111504	ADD WASHER H4	C. LEE	10/23/93
			<i>Chapman</i>	11/30/93

ASSEMBLY NOTES:

1. REFERENCE ANSI/IPC A 610A CLASS 3, EXCEPTIONS BELOW.
2. CLINCHED LEADS MUST NOT MAKE PHYSICAL CONTACT WITH OTHER LEAD(S), TRACE(S), PAD(S).
3. NICHICON CAPS MAY BE FLUSH TO PCB.
4. TO 220 REGULATORS U1, U8, 45° ANGLE ACCEPTABLE.
5. FSI HEIGHT REQ .06-.20 ABOVE PCB SURFACE. FSI IS A POST WAVE, HAND SOLDER W/KESTER 245 NO CLEAN SOLDER OR EQUIVALENT, NO CLEANING REQ'D. FLUX RESIDUE ACCEPTABLE.
6. FSI, R16 MUST HAVE ACCEPTABLE WETTING SOLDER SIDE.
7. LED HEIGHT: .80 MAX ABOVE PCB SURFACE.
8. TO 92 FETs: NO VISIBLE BREAKS ON LEADS. Q1, Q2, Q3, Q5, Q6, Q7 HEIGHT REQ .275 MAX.
9. J1, J4A, J4B, J6A, J6B, J7, C32: SOLDER SIDE COMPONENTS. J6A-2 CUT PIN OF CONNECTOR.
10. C32/SPACER FLUSH WITHIN .02.
11. C34, NO STRESS ON LEGS. CAP VALUE VISIBLE.
12. LEAD BEND ON GLASS DIODE(S) IN4148 PER 15° ANGLE RULE.



SOLDER C34 TO PADS AS NOTED,
INSTALL WITH VALUE FACING UP
(VALUE CAN BE READ)



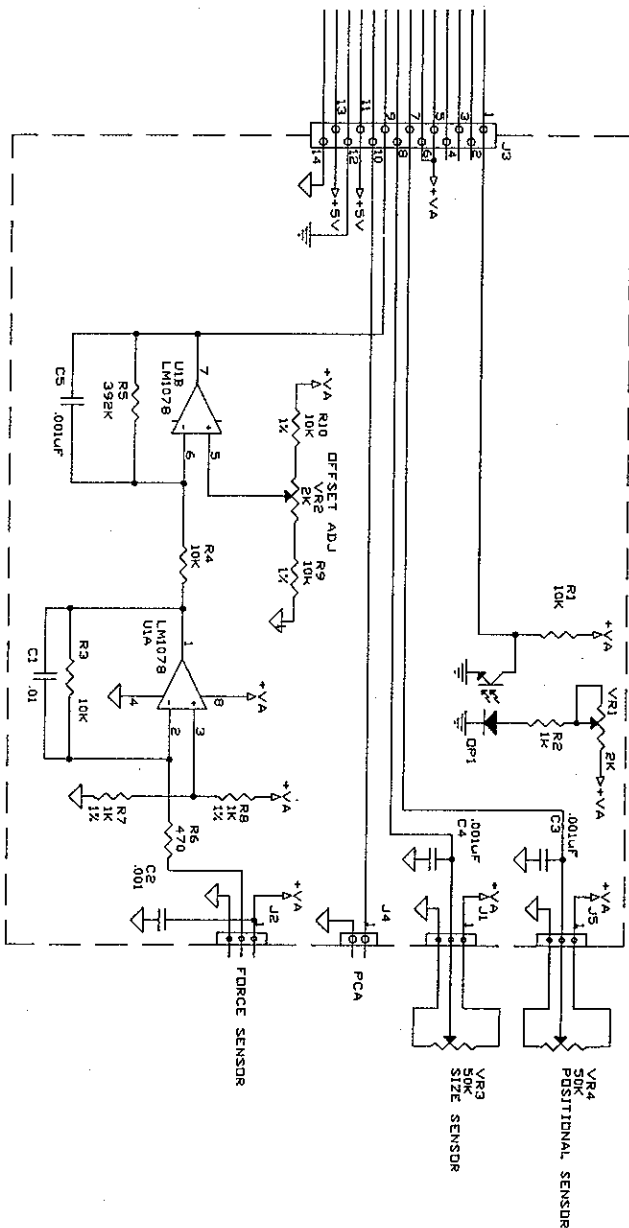
ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING
ELECTROSTATIC
SENSITIVE
DEVICES

medexing

Main PCB S/A

Part No. 1-68-20E01-0-A

REV	DOC #	DESCRIPTION OF REVISION	APPROVED	DATE
01	90052101	ADDED C103, C104, C105	LOUIS GARCIA	7-12-90
1A	91090402	CHANGED R102 FROM 2.2K TO 1K	R. BOOTH	7-12-90
			C. LEE	9-13-91
1B	92090403	CORRECT C102 AND R105 TO PROPER VALUES, AND CHANGE REFERENCE DES.	R. BOOTH	9-18-91
			<i>dyg</i>	9-22-92
			<i>gph</i>	9-29-92

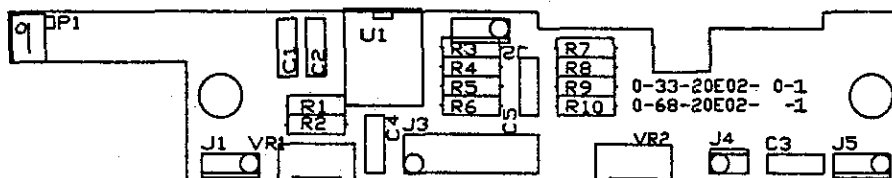


CONNECTS TO JS
2-33-20E01-0-0

REV	DCN #	DESCRIPTION OF REVISION	APPROVED	DATE
1	91100304	UPDATE TO CURRENT PCB REV, REDRAWN	C. WILKINSON	10/17/91
			R. BOOTH	10/18/91
A	93031801	ADD IPC ASSEMBLY NOTES	C. LEE	3/19/93
			O. PARKER	3/19/93
B	93110304	REVISE ASSEMBLY NOTES FOR OP1 INSULATOR	<i>D. K. L.</i>	11-5-93
			<i>Proff</i>	11/5/93

ASSEMBLY NOTES:

1. REFERENCE ANSI IPC A 610A CLASS 3, EXCEPTIONS BELOW.
2. OP1 WITH INSULATOR ORIENTED AS FOLLOWS:
SIDE WITH ROUNDED STANDOFFS GOES TO PCB. HEIGHT TO BE .290-.322
SOLDER SIDE PCB TO TOP SIDE OP1.
3. CLINCHED LEADS MUST NOT MAKE PHYSICAL CONTACT
WITH OTHER LEAD(S), TRACE(S), PAD(S).
4. C3 LAY DOWN ON PCB.
5. ALL COMPONENT VALUES TO BE VISIBLE.
6. J2 MASK OFF, NO SOLDER.



ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING
ELECTROSTATIC
SENSITIVE
DEVICES



Aux PCB S/A
Part No. 1-68-20E02-0-1

APPENDIX C.

MICRO-CONTROLLER I/O

PORT DEFINITIONS

Port 0:

P0.0-P0.3: (output) stepper motor waveform
P0.4: (output) alarm ON(1) / OFF(0)
P0.5-P0.6: not used
P0.7: (output) A/D REF power(VA)* ON(0) / OFF(1)

Port 1:

P1.0-P1.3: input from Multiplexer
: Keypad input; if P3.7=1, P1.6=0, P2.7=1
: P1.0-ROT, P1.1-AC; if P3.7=1, P1.6=0, P2.7=0
P1.3: input from A/D if P3.7=0, P1.6=1, P0.7=0

P1.4: output, Motor power High (1), Low (0)
P1.5: output, LCD control E
P1.6: output, LCD control RS or Multiplexer OE* (0-enabled)
P1.7: output, LED latch clock

Port 2:

P2.0-P2.7: 8-bit data bus to LCD display and LED latch
P2.0-P2.3: output scanning signals for the keyboard
P2.4: output, A/D CLK
P2.5: output, A/D DI (data input)
P2.7: output, select one set of inputs from multiplexer.

Port 3:

*P3.0: output, send pulses to the watchdog circuit
*P3.1-P3.2: reserved for serial communication
P3.3: output, control LCD display Read(1) / Write(0)
P3.4: output, Volume Limit LED ON(1) / OFF(0)
P3.5: output, LCD backlight* ON (0) / OFF(1)
P3.6: output, Alarm Volume Loud(1) / Soft(0)
P3.7: output, CE* control for A/D (0-enabled)

***NOTE:** For 2010i or 2000 series pumps with RS232 software, P3.2 and P3.0 functions are reversed.

APPENDIX D.

SYSTEM PERFORMANCE TESTS

2000 Series Test Procedure

ASSOCIATED MATERIALS:

- A. Hand tools
- B. AC power source
- C. Force transducer test gauge

PROCEDURE:

Identify and record pump model and serial number.

Step 1: Visual Inspection

- A. Inspect for correct labeling.
- B. UL approved serial number label and charger label for all units excluding German pumps and pumps with a Serial Number lower than 3000.
- C. Syringe Placement Label on all pumps except German pumps.
- D. Brief Instruction Label on all 2001 pumps except German.
- E. On/off switch is oriented with the "1" towards the slide on all units except the English version which is blank.
- F. Check overall cosmetic appearance. No finger print on LCD window.
- G. Turn unit on all sides and check for any loose parts both internal and external.

Step 2: Operational Checks: DC Mode

- A. Check syringe slide operation. With clutch disengaged, carriage must slide freely along it's full travel with no appreciable friction or binding. Clutch should freely disengage and spring back into engagement.
- B. Syringe Plunger Retainer should be firmly attached to Syringe Driver.
- C. Check for proper lift and function of the syringe clamp. For German Pump, use German syringes. Clamp must lock onto syringe tabs.
- D. With unit unplugged from AC power, turn the power switch on. After checks, unit should be in program mode with audio alarm and "battery in use" (German: "BATT. Betrieb") light illuminated. Record on the top of the form the software version, alarm vol, alarm delay, batt.V., options. Use overlay and manual with German displays added for German version.

2000 Series Test Procedure (Cont'd)

Observe for:

- E. Proper software revision
- F. Proper power-up system check
- G. Alarm sound quality and volume
- H. LED's function
- I. LCD display contrast
- J. Programming - 2001: Select Mode - Continuous, Select Manufacturer - BD, Load BD 1cc Syringe, Select Volume Limit - 01.00 ml, Select Rate - 11.00 ml/hr.

2001, 2010, 2010i: Select Mode - ml/hr, Select Bolus - Yes, Select Manufacturer -BD, Load BD 1cc Syringe, Select Bolus amount - 00.10 ml, Select Rate - 11.00 ml/hr. Verify operation of all keys used during this sequence. Pumps may be preprogrammed to exclude certain options. Vary the modes, manufacturers, and rates for different pumps, if necessary, and record the parameters used.
- K. Push and hold "prime" key approximately 21 seconds. (Display should indicate PRIME VOL = XX.XX ML.) Verify visually syringe cradle movement.
- L. Press "deliver" key. Unit should begin moving the syringe cradle, and incrementing the Total Volume delivered display. The 2001 unit will also increment the Running Volume Display but the 2010 will display pre-programmed Bolus amount.
- M. Test the occlusion alarm as follows:
While in the deliver mode apply hand pressure to the syringe driver to activate the occlusion alarm. The pressure required to activate the alarm will vary with the syringe size, less is needed for the small syringe sizes and more is needed for the larger sizes.
- N. Resume the deliver mode, push in clutch lever and manually move track. Verify "Check Clutch" LCD message/audio alarm.
- O. Resume the deliver mode, remove syringe while delivering. Verify "Syringe Pops Out" LCD message/audio alarm.
- P. 2010 only: Test Bolus function by pressing the "Bolus" and "Prime" keys. Bolus amount and total volume delivered should be displayed.
- Q. Resume the deliver mode, run through "near empty" alarm and verify alarm function.
- R. Continue deliver function and verify empty alarm.
- S. After empty alarm, pressing the "backlight" button on the 2001, or any key on the 2010 or 2010i, should cause the LCD backlight to illuminate.
- T. Pressing "reset total volume" button should change the "Total Volume" display to 0.00.
- U. Disengage Plunger. Resume delivery. Pump should alarm "load syringe plunger, press enter". If Track-2 utilizes the moving plunger retainer, disengage plunger.

2000 Series Test Procedure (Continued)

Step 3: Operational Checks: AC Mode

- A. Plug unit in AC receptacle, and turn power switch off, then on. Unit should go through power up sequence as in Step 2: D, except that "battery in use" LED should be off, and "battery charging" LED should be on.
- B. Verify unit programs properly, as in Step 2:J.
- C. Verify backlight is illuminated in the AC mode.
- D. Turn the AC power off, leaving the unit's power switch on. No interruption in function should occur, but the "battery in use" LED should begin flashing.
- E. Turn the unit's power switch off. Plug unit in AC receptacle, depress and hold "stop/program" and "deliver" keys simultaneously while turning the unit's power switch on. Unit should display "BATTERY TIME=00.00". After one minute the LCD will display "BATT.V= X.X" and "BATTERY TIME = 00.01"

Step 4: Transducer Calibration Check

- A. Press stop/program and select key at the same time, turn pump on, hold for approximately one second and release. Lock = 000.0 will appear on the display. Key in 100.0 onto the display for the 2001 and 2010. Key in 005.0 for the 2010i. Press enter. Access complete. Display will show "Force (lb) 00.XX=XX". This value for the 2010i should be greater than CO.
- B. For the 2010i, depress the clutch lever and place a penny in the plunger retainer assembly. Then release the clutch lever. Record the Hex number when no pressure is applied to transducer. Reading cannot be lower than OD nor higher than 15.
- C. Test the occlusion pressure using the 2000 series force gauge. Place gauge on the pump, and set gauge to the values stated on the "Test Report". The 2000 Series Pump display should read within the stated tolerances.

STEP 5: Position Sensor Test (This test should be done with the clutch disengaged.)

- A. Press the stop/program key once. "Pos. (inch)" appears on display. For the first readings, move track so that 0.000 is shown on the display. Record this number and its corresponding HEX number. Move track so that $4.836 \pm .005$ is shown on the display. Record this number and its corresponding HEX #. If 0.000 and/or $4.836 \pm .005$ cannot be reached, the pump will need to be recalibrated. For the second readings, move the track to the lowest point possible. Record this # and its corresponding HEX #. Move the track to the highest point possible. Record this # and its corresponding HEX #. Verify that the lowest point HEX # is equal to or less than the 0 reading HEX # by one HEX digit only. Verify that the highest point HEX # is equal to or greater than the 4.836 reading HEX # by one HEX digit only. HEX # at 0 point must be between 06 and 18. HEX # at highest point must be less than FA.

STEP 6: Syringe Recognition Test

- A. Press the stop/program key once again. Size (inch) will appear on the display. Insert syringes listed and record decimal number displayed for each syringe. Compare number recorded with LOW and HI limits and check either accept or reject.

2000 Series Test Procedure (Continued)

STEP 7: Flow Test (if applicable)

- A. Select any size syringe from BD, Mono, or Terumo. Plan to use more than 70% of the syringe. The size of syringe selected will determine the size of pipet you should use. Try to use at least 70% of the pipet. 3cc syringes should use a 2 ml pipet, 6 cc syringes should use a 5 ml pipet. 20-35 cc syringes should use a 25 ml pipet.
- B. Record the syringe type, syringe size and pipet size on the inspection form.
- C. To determine the rate you must decide on the dose volume and the delivery time. The dose volume should be more than 70% of the syringe volume. The delivery time should be no less than 20 minutes. To calculate the rate, you will divide the dose volume by the delivery time. (Delivery time must be in decimal form)
Rate = $\frac{\text{Dose Vol.}}{\text{Del. Time}}$
- D. Record the rate, elapsed time and predicted volume (Dose Volume) on the inspection form.
- E. Fill the syringe with distilled water and connect to the extension set. Distilled water should always be used as tap water may leave deposits in the pipet which will affect results. All air bubbles must be removed to insure an accurate flow test. If bubbles are in the tubing, prime them out before attaching to the pipet.
- F. Load syringe into the syringe saddle and program unit for delivery. Verify syringe size and manufacturer and what is programmed. Prime unit to the first significant number on the pipet. Set a timer for the correct delivery time. Start the timer and the delivery. At end of delivery, record the delivered volume on the inspection form.
- G. To determine the percentage error you will take the actual delivered volume and subtract the predicted or dose volume. Divide the difference by the predicted or dose volume and then multiply by 100. [(Actual - Dose Volume) divided by dose volume] * 100.
- H. Record the percentage error on the inspection form. Acceptable range is +/- 3%.

Step 9: Final Check

Fill in the Inspection Form for 2000 series, for all test categories. Note any improper function in the reject column and corrective action in the comments section.

2000 SERIES TEST REPORT

Model _____
 S/N _____
 Software Version _____

Alarm Vol. _____ Alarm Delay _____ Batt. V. _____ Options _____

	<u>Accept</u>	<u>Reject</u>
Step 1: VISUAL:		
A. Verify S/N label on pump	_____	_____
B. Verify UL approved and charger label where applicable	_____	_____
C. Syringe Placement Label (if applicable)	_____	_____
D. Brief Instruction Label (if applicable)	_____	_____
E. On/off switch properly oriented	_____	_____
F. Overall appearance	_____	_____
G. Loose parts - internal and external	_____	_____

Step 2: OPERATIONAL CHECKS: (in DC Mode)

A. Syringe slide function	_____	_____
B. Syringe plunger retainer attached	_____	_____
C. Syringe clamp function	_____	_____
D. Power switch function	_____	_____
E. Proper software revision	_____	_____
F. Proper power up system check	_____	_____
G. Alarms sound quality and volume	_____	_____
H. LED's function	_____	_____
I. LCD display contrast	_____	_____
J. Programmable	_____	_____
K. Priming function	_____	_____
L. Delivery function (RV displayed, 2001 only)	_____	_____
M. Occlusion alarm function (finger press.)	_____	_____
N. "Check clutch" message/alarm	_____	_____
O. "Syringe pops out" message/alarm	_____	_____
P. Bolus function (2010 and 2010i only)	_____	_____
Q. Near Empty Alarm	_____	_____
R. Empty Alarm	_____	_____
S. Light switch function	_____	_____
T. Reset volume switch function	_____	_____
U. Plunger Detection (if applicable)	_____	_____

Step 3: OPERATIONAL CHECKS (in AC Mode):

A. Power Up	_____	_____
B. Programmable	_____	_____
C. Verify backlight to illuminate	_____	_____
D. Uninterrupted function when AC power is disconnected	_____	_____
E. Charging function	_____	_____

Step 4: TRANSDUCER CALIBRATION CHECK:

A. Program in Test Mode-Code 100.0 or 005.0	_____	_____
Hex Number _____ (>C0)	_____	_____
B. Hex Number at 0 lb. _____ (0D -15)	_____	_____
C. 3.0±.5 _____, 8.0±.75 _____, 15.0±1.5 _____	_____	_____

2000 SERIES TEST REPORT (Continued)

Step 5: POSITION SENSOR CALIBRATION

A.
 1st reading: 0.00 _____ HEX _____ 4.836+.005= _____ HEX= _____
 2nd reading: Lowest point = _____ HEX= _____
 Highest point = _____ HEX= _____

*Lowest point HEX number must be equal to or less than 0.00 reading
 HEX number, by 1 HEX digit only. HEX number must be between 06 and 18.
 Highest point HEX number must be equal to or greater than 4.836
 reading HEX number, by 1 HEX digit only. HEX number must be less than FA.*

Step 6: SYRINGE RECOGNITION TEST

A.	<u>MFG/SIZE</u>	<u>LOW</u>	<u>HI</u>	<u>DISPLAYED NUMBER</u>	<u>ACCEPT</u>	<u>REJECT</u>
	No Syringe	.088	.117 ~~.115~~	_____	_____	_____
	TERUMO	.135		_____	_____	_____
	1 ML	~~.145~~	.171	_____	_____	_____
	5 ML	.461	.531	_____	_____	_____
	20 ML	.790	.860	_____	_____	_____
	60 ML	1.188	1.258	_____	_____	_____

Step 7: FLOW TEST

A.

<u>Syr. Type</u>	<u>Syr. Size</u>	<u>Pipet Size</u>	<u>Rate ML/Hr</u>	<u>Elapsed Time</u>	<u>Predict Volume</u>	<u>Deliver Volume</u>	<u>+ 3% Error</u>

COMMENTS: _____

Step 8: FINAL CHECK: Repeat Steps 1 to 8 if any of these steps are rejected.
 Note corrective action in comments.

Accept/Reject (Circle One)

 Inspector/Date

APPENDIX E.

SPARE PARTS LIST & TEST FIXTURES

NOTES:

1. PART NUMBER FORMAT: 0-AA-BBBBBB-C-X, X IS REVISION #
X WILL BE CHANGED DUE TO REVISION.
CONSULT MANUFACTURER FOR THE APPROPRIATE REVISION LEVEL.
2. REFER TO ASSEMBLY DRAWING FOR ITEM # IN SUBASSEMBLY.

2000 SERIES SPARE PARTS LIST

Part Number Description

*2000 Series Parts

*Please note:

When ordering parts for the model 2010i, please refer to the section titled "Model 2010i Parts". If your part is not listed in that section, it is a part common to all 2000 series pumps and can be ordered from the 2000 Series Parts.

0-68-20A00-0-X	Top Housing S/A (specify Software Version #)
0-84-K2001-0-X	Keypad 2001
0-84-K2010-0-X	Keypad 2010
0-68-20C00-0-X	
LCD Display S/A	0-68-20E01-0-X Main Board S/A
0-68-20 - -	MPU, Programmed (specify Model # and Software Version #)
	Consult factory for exact part number
0-87-1P5SB-0-0	Fuse, 1.5A slo-blo (soldered on Main Board)
0-48-20000-0-X	Top Housing 13.50
0-32-23223-0-X	Red LED
0-32-PS301-0-X	Yellow LED
0-32-23233-0-X	Green LED
0-03-11R51-0-X	11.5 ohm 1% 1/8 watt resistor
0-17-AD834-0-0	A/D Converter
0-20-0317T-0-X	IC, Regulator, Adjustable
0-20-02931-0-X	IC, Regulator 5V, Low Drop-Out
0-68-20A01-0-X	Bottom Housing S/A
0-48-20001-C-0	Bottom Housing
0-68-20C09-0-X	Battery Pack S/A
0-68-20C01-0-0	Power Switch S/A
0-48-20025-0-0	Switch Guard (need 2pcs per pump)
0-68-20C02-0-X	DIN Receptacle S/A
0-68-20C06-0-X	Alarm S/A
0-28-EC100-8-0	Strain Relief 8-pin
0-39-TT102-0-0	Wire Tie
0-49-20003-0-0	Rubber Bumper
0-68-20A02-0-X	Slide Housing S/A
0-68-20A04-0-X	Plunger Holder/Track S/A
0-48-20002-C-X	Track
0-26-20000-0-X	Force Sensor Plate with Cable
0-26-20001-0-0	Blank Sensor Plate
0-48-20008-0-0	Plunger Holder/Insert
0-48-20035-0-X	Plunger Retainer
0-68-20A03-0-X	Slide S/A
0-48-20007-0-X	Saddle
	(order 2 each P/N 0-50-20017-0-0 at no charge per each saddle ordered)
0-79-14280-0-0	Main Cable
0-68-20C08-0-X	Stepper Motor S/A
0-48-20006-0-0	Syringe Clamp
0-68-20C04-0-X	Pot. S/A
0-48-20013-0-0	Clamp Gear
0-50-20009-C-0	Torsion Spring

Part Number	Description
0-48-20019-0-0	Pot. Clamp
0-48-20020-0-0	Spring End Clamp
0-48-20024-0-0	Position Pot. Holder
0-48-20014-0-0	Position Pot. Gear
0-48-20015-0-0	Cluster Gear
0-39-13318-0-0	E-Clip, Cluster Gear
0-49-20001-0-1	Cable Seal
0-48-20031-0-0	Cable Seal Plug
0-48-20052-0-0	Clutch, Upper Half
0-48-20053-0-0	Clutch, Lower Half
0-48-20018-3-X	Clutch Key
0-50-20008-0-0	Clutch Spring
0-50-20007-0-X	Clutch Actuator
0-48-20009-0-0	Clutch Lever
0-48-20016-0-0	Clutch Cover
0-50-20001-0-X	Leadscrew
0-48-20034-0-0	Leadscrew Thrust Bearing
0-48-20023-0-0	Leadscrew Bearing
0-48-20010-0-0	Worm Gear
0-39-13311-0-0	E-Clip, Leadscrew
0-68-20E02-0-X	Aux. Board S/A
0-48-20005-0-0	Slide Door
0-48-20027-0-0	Water Seal
0-49-20002-0-0	Clamp Seal
0-68-20A05-0-0	Worm/Coupling S/A

Bottom Housing Hardware

0-42-90372-0-0 Screw, 4-40x3/8 Phil Pan HD SS

Top Housing Hardware

0-42-90252-0-0 Screw, 4-40x1/4 Phil Pan HD SS
0-42-J1002-0-0 Hex Head, SS, 4-40x1.00
0-42-04503-0-0 Standoff, 3/16 Hex Male-Female
0-42-1653N-0-0 3/16 Round Female Standoff
0-42-4505B-0-0 3/16 Hex Male-Female Standoff

Slide Housing S/A Hardware

0-42-80622-0-0 5/8 Set Screw 4-40x.625 SS
0-41-90502-0-0 Screw, Pan Phil HD, SS, 2-56x1/2
0-41-93122-0-0 Screw, Pan Phil HD, SS, 2-56x5/16
0-42-90252-0-0 Screw, Pan Phil HD, 4-40x1/4
0-42-G7701-0-0 3/16 Hex Female, Standoff
0-42-2098B-0-0 1/4 Hex Female Standoff
0-42-A0252-0-0 Screw, Flat HD Phil, SS 4-40
\$0.05

Final Assembly Hardware

0-42-A0502-0-0 4-40x1/2 Flat HD Ph SS

*Model 2010/ Parts

0-84-K201i-0-0 2010i Keypad
0-68-20A07-0-0 Slide Housing S/A
0-68-20A10-0-1 Plunger Holder S/A
0-48-20047-0-0 Track II
0-48-20048-0-1 Plunger Holder II

Handwritten: 6234

Part Number	Description
-------------	-------------

0-48-20051-0-0	Switch Cam
0-42-81902-0-0	Set Screw
0-48-20049-0-0	Plunger Retainer II
0-68-20A08-0-0	Transducer S/A
0-68-20E04-0-0	Flex Circuit S/A
0-50-20025-0-0	Transducer Spacer Half
0-48-20060-0-0	Cable Strain Relief
0-26-20001-0-0	Blank Sensor Plate
0-46-E075A-0-	Alloy Steel Socket Screw
0-39-9028D-0-0	Mounting Screws
0-28-TW0T3-0-0	3 Pin Connector
0-48-20050-0-1	Clutch Lever II
0-48-20052-0-0	Clutch, Female Half - 2
0-48-20053-0-0	Clutch, Male Half - 2
0-48-20055-0-2	Clutch Cover II
0-48-20057-0-1	Clutch Key - III
0-50-20027-0-2	Clutch Actuator - II

Pole Clamps

0-43-A0372-0-0	Screw, 6x32x3/8 Flat HD, Ph, SS
0-68-20M00-0-X	Pole Clamp Kit
2000 RPC	Rotating Pole Clamp (Complete Set)
2000 BP	Mounting Plate for Rotating Pole Clamp
2000 PC	Rotating Pole Clamp (Clamp Assembly Only)
2001 CB	T-Bar Accessory for Mounting Two Pumps
2000 TC	Syringe Pump Transport Clamp

Manuals

A-61-20SM1-0-X	2000 Series Syringe Infusion Pump Service Manual (Each)
9-61-20000-0-X	Model 2001 Operations Manual
9-61-20100-0-X	Model 2010 Operations Manual
9-61-2010i-0-X	Model 2010i Operations Manual

Labels

0-61-20005-0-0	2001 Brief Operating Instruction Label
0-61-20102-0-0	Syringe Retainer Label (2001/2010)
0-61-20002-0-X	Charger Label

Chargers

4PC	Four Pump Charger
20C07	Wall Mount Charger, Hirschmann Connector
20C11	In Line Charger, Hirschmann Connector
0-28-DP003-0-0	DIN Plug (Hirschmann Connector Only)
0-28-DP000-0-0	DIN Collar (Hirschmann Connector Only)
2HC07	Wall Mount Charger, Hypertronics Connector
2HC11	In Line Charger, Hypertronics Connector
2000 HSK	Hypertronics Connector Service Kit
0-68-2HC02-0-X	Hypertronics Cable S/A
0-68-HYP01-0-X	Accessories Hypertronics Strain Relief S/A

(connector for charger)

Miscellaneous

2000 CTH	Syringe Pump Counter Top Holder
2001 LB	Syringe Pump Lock Box

Medex Returned Goods Policy

Authorization Required - Contact Sales Rep. or Technical Service Department directly at 800/648-0840 for returned authorization number. Only unopened, undamaged items are returnable. **Non Returnable Item:** Product that has been purchased more than six months prior to return. Product destroyed or damaged from insurable causes such as fire, water, tornado, etc. Transportation charges are to be prepaid by the customer except in the event of a shipping error by Medex, Inc. **Terms of Return Policy:** Full credit is to be issued for returnable items if returned within 30 days of purchase provided a replacement order is placed. A 25% restocking fee will be deducted from purchase price after 30 days.

Shipping - FOB Atlanta, Georgia

Pricing - Terms, Net 30 days. Prices subject to change without notice.

2000 SERIES TOOL LIST

60/AR

TEST/CALIBRATION FIXTURES

2001FC Force Gauge
SIZEK Size Calibration Kit

TEST/REPAIR FIXTURES

2X002 Battery Calibration Fixture
0-47-20001-0-X Motor Bracket Alignment Tool
0-47-20002-0-X Leadscrew Installation Tool
0-47-20003-0-X DIN Ring Tool (For Hirschmann Type Connectors)
0-47-20004-0-X Torsion Spring Driver
0-47-20006-0-X Front Shim, Plunger Holder 22. .016"

OTHER SUPPLIES: AVAILABLE FROM MANUFACTURERS AS LISTED:

CAL 36/4 Torque Screw Driver 20.00 99.95 for plunger
Model #810587 MFR: Sturtevant/Richmont
TT#304TO034 DIST: Techni Tool
5 Apollo Road, Box 368
Plymouth Meeting, PA 19462
Phone: (215) 941-2400

TT#840TO020 Hex Key 3/32 \$1.30
(Need with Torque Screw Driver Above)
Same Manufacturer

667-3 Side Shim, Plunger Holder 22.20 .003"
.003 Shim Stock MFR: Starrett
DIST: Ziegler Tools
711 Marietta Street, P.O. Box 93958
Atlanta, GA 30318
Phone: (404) 892-7117

667-16 Side Shim, Plunger Holder 2
.016 Shim Stock MFR: Starrett
DIST: Ziegler Tools (Address/Phone No. Listed Above)

TT#826SC012 Torque Screw Driver \$149.45
MFR: Utica
DIST: Techni Tool (Address/Phone No. Listed Above)